

## 6-1: $n^{\text{th}}$ Root Functions

**Warm-up:** Solve each equation and indicate what it says about  $n^{\text{th}}$  roots.

1.  $x^2 = 169$

2.  $w^3 = 216$

3.  $y^3 = -\frac{1}{8}$

4.  $z^4 = 625$

$n^{\text{th}}$  root:

*Question:* How do you determine the number of solutions for power functions?

*Power of a Power Property:*

$n^{\text{th}}$  root functions:

*Radical:*

$n^{\text{th}}$  root of  $x$ :

*Example 1:* Show that 1.5 is the cube root of 3.375, but  $-1.5$  is not.

*Example 2:* Evaluate.

a.  $\left(\frac{1}{8}\right)^{\frac{1}{3}}$

b.  $\sqrt[4]{81}$

*Example 3:*

a. Graph the functions  $f(x) = x^6$  and  $g(x) = x^{\frac{1}{6}}$ . (Use your graphing calculator and sketch it below.)



b. On what domain are  $f$  and  $g$  inverses?

*Example 4:* Give the formula for the radius  $r$  of a sphere with surface area  $S$ .

Homework: